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The Importance of Form in Skinner's Analysis of Verbal Behavior and a Further Step

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A series of quotes from B. F. Skinner illustrates the importance of form in his analysis of verbal behavior. In that analysis, form plays an important part in contingency control. Form and function complement each other. Function, the array of variables that control a verbal utterance, dictates the meaning of a specified form; form, as stipulated by a verbal community, indicates that meaning. The mediational actions that shape verbal utterances do not necessarily encounter their controlling variables. These are inferred from the form of the verbal utterance. Form carries the burden of implied meaning and underscores the importance of the verbal community in the expression of all the forms of language. Skinner's analysis of verbal behavior and the importance of form within that analysis provides the foundation by which to investigate language. But a further step needs to be undertaken to examine and to explain the abstractions of language as an outcome of action at an aggregate level.

Key words: verbal behavior, form, function, mediation, language

In the last sentence of the last page of his treatise on verbal behavior, Skinner states:

> ''a verbal environment could have arisen from nonverbal sources and, in its transmission from generation to generation, would have been subject to influences which might account for the multiplications of *forms* [italics added] and controlling relations….'' (1957, 2011, p. 470)

The summary sentence underscores an important point addressed again and again throughout his book, *Verbal Behavior*—the importance of form in lingual action.

I do not like to parade too many quotes and references in the discussion of a topic. Such action has always struck me as leaning on the authority of what someone else has said rather than the value of one's own analysis. They remind me of those over-raisined rum cakes served up by under-skilled cooks. The army of raisins, and confectionary camp followers, completely demolishes whatever taste the cake was supposed to have. That may be the point. There is no demolishing. It is a disguising—that in-between the gumdrops and raisins there is not much to taste. But here there is no escaping that I have made an assertion about Skinner's position and that it needs to be verified, or minimally, illustrated, by what he wrote. Such illustrative evidence is necessary to advance the argument that the topographic factors of verbal behavior are as important as the ''functional'' ones, and that topography and functionality are partners as clearly indicated by the inclusive *and* in his phrase ''multiplications of forms ***and*** controlling relations'' [emphasis added].

What follows, then, is a series of quotes from Skinner drawn successively at random from the first 10 chapters (of the 19) in *Verbal Behavior* as even this many skimmed seemed a bit of overkill. All are quotes (two from a chapter) and in each quote I highlighted the word ''form'' in bold italics:

> If by chance the environment changes, old ***forms*** of behavior disappear, while new consequences build new ***forms***. (chap. 1, p. 1)

> Separate variables combine to extend their functional control, and new ***forms*** of behavior emerge from the recombination of old fragments. (chap. 1, p. 10)

> A response, as an instance, can be completely described as a ***form*** of behavior. (chap. 2, p. 20)

> We observe that a speaker possesses a *verbal repertoire* in the sense that responses of various ***forms*** appear in his behavior from time to time in relation to identifiable conditions. (chap. 2, p. 21)

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> In a given verbal community, however, certain ***formal*** properties may be so closely associated with specific kinds of variables that the latter may often be safely inferred (chap. 3, p. 36)
>
> A mand assumes a given ***form*** because of contingencies of reinforcement maintained by the listener or by the verbal community as a whole. (chap. 3, p. 46)
>
> But where the appearance of a person as a listener at the second stage increases the probability of many ***forms*** of verbal behavior.… (chap. 4, p. 53)
>
> In a very large part of verbal behavior a given ***form*** of response does not yield a specific reinforcement and hence is relatively independent of any special state of deprivation or aversive stimulation. (chap. 4, p. 53)
>
> The relative frequency with which the listener engages in effective action in responding to behavior in the ***form*** of the tact will depend upon the extent and accuracy of the stimulus control in the behavior of the speaker. (chap. 5, p. 88)
>
> Fable, myth, allegory—in short, literature in general—create their own vocabularies by connecting verbal ***forms*** with descriptions of particular events or occasions from which they may then be metaphorically extended. (chap. 5, p. 99)
>
> The generalized reinforcement accorded the speaker may vary with subject-matter or ***form*** of response.… Generalized reinforcement may be deliberately used to strengthen particular ***forms*** or themes in the verbal behavior of a subject.… (chap. 6, p. 148)
>
> Certain standard ***forms*** of verbal behavior, identified as such, evoke only nonpractical behavior in the reader. (chap. 6, p. 150)
>
> Audience control is always exerted in concert with stimuli determining more specific ***forms*** of response. (chap. 7, p. 172])
>
> In a Chinese verbal community, only certain ***forms*** of response are effective; as an audience, any member of group of members of this community constitutes the occasion for the emission of forms called ''Chinese.'' (chap. 7, p. 172)
>
> When all the features of the thing described have been taken into account and when the audience has been specified, the ***form*** of the response is determined. (chap. 7, p. 175)
>
> It is not a classification of ***forms*** of response, since we cannot tell from ***form*** alone into which class a response falls. (chap. 8, p. 186)
>
> The stimuli which control a verbal response not only determine its ***form*** and thus supply an equivalent for meaning, they.… (chap. 8, p. 199)
>
> Since the ***form*** of echoic and textual responses is determined by verbal stimuli, they almost always have the same ***form*** as other operants. (chap. 9, p. 227)
>
> Only echoic and textual behaviors fail to show a single variable in control of many ***forms*** of response. (chap. 9, p. 228)
>
> But if this step has been ruled out, we shall have to introduce other variables characteristic of other operants having the same ***form*** of response. (chap. 10, p. 253)
>
> To strengthen a mand of this ***form***, we could make sure that no pencil or writing instrument is available.… (chap. 10, p. 253)

We review the import of these quotes in the context of: Skinner's science; governance of its principles; the verbal forms themselves; and what Skinner's analysis implies for an understanding of language and its lingual expression in any established community. I begin by identifying the scope of Skinner's science and by reminding readers of the reasons for preferring the term *behaviorology* as its disciplinary name, a name that will appear throughout the subsequent discussion.

BEHAVIOROLOGY

''What's in a name?'' we may ask along with Juliet.[1] Many people practice at least parts of the science (and its derivative technologies) Skinner founded and do so under a variety of disciplinary names. A few

[1] It seemed hardly necessary to note that Juliet is Shakespeare's. The later phrase ''feather by feather'' resonates Anne Lamott's fine book on writing, *Bird by Bird*. The initial manuscript I submitted to the journal had but two references; one to Skinner (1957) and one to Matos and Passos (2006). The reviews, an excellent set and among the best I've received, brought up a number of issues that needed to be pushed further and indirectly suggested I double down a bit with literature that would help explore them. My article is thus no longer occupied by a couple of ''confectionary camp followers'' but by a multitude of them. Since the article deals with a few contentious matters, many references were provided so that parties on one side of an issue could follow up on the other.

are: counseling, special education, psychology, behavioral psychology, behavior analysis, and behaviorology. Though Juliet also said that a ''rose by any other name would smell as sweet,'' communities of professionals differ, often vociferously, in the disciplinary names preferred. A number of to and fros have transpired over what behavioral scientists in the Skinnerian tradition call themselves.

Since the founding of the Association of Behavior Analysis and the recent establishment of the Association of Professional Behavior Analysts, the disciplinary title most closely paired with Skinnerian science has been *behavior analysis*. Unfortunately, it is not a clean pairing. A number of people call themselves ''behavior analysts'' and apply what they state is ''behavior analysis.'' Yet what is ascribed to Skinner may resemble little of Skinner's science and may even be quite critical of it, stating that its methodology is ''atavistic'' or disavowing even one of Skinner's greatest accomplishments, his analysis of verbal behavior. In contrast, behaviorologists unambiguously commit themselves to Skinnerian science under the label of *behaviorology*.

Much as *biology* designates the study (*-ology*) of life, *behaviorology* designates a domain of endeavor, the study (*-ology*) of behavior. And like biology, what is pertinent is its theoretical foundation; in biology's case, Darwin's *natural selection*; in behaviorology's, Skinner's *contingency selection*. Behaviorologists initiated their discipline as an unambiguous expression of Skinnerian science. A bit of the pertinent literature follows for those interested in what *behaviorology* represents: Ledoux (2012), Ulman & Vargas (2005), Vargas (1987, 1991, 1993, 1996). The website for the International Society of Behaviorology (ISB) provides a running account of current endeavors. But though they may differ fastidiously in particulars, behaviorologists state unequivocally that the science of behaviorology is founded upon and operates within the parametric dimensions of the examination of behavior as specified by Skinner. The science covers all behavior in the animal kingdom, of whatever form and under whichever controls selected by consequences (Skinner 1969/2012, 1987). Contingent controls embody the pairing of values of an independent variable to values of a dependent variable, and show themselves by their functional relation to an action form.

PRINCIPLES AND GOVERNANCE

Function and form complement each other in an analysis of verbal behavior, as they do in the analysis of any behavior. In all behavioral relations, whether nonverbal or verbal, both function and form require the other. Form is the name we give a specified action and function points to the events that control it. Obviously all verbal behavior, as action, is the result of an event or several events, both nonbehavioral and behavioral. We state this matter more technically by saying that action, verbal or nonverbal, emerges as the dependent variable in a functional account with one or more independent variables. Designating those controlling relations provides us with the meaning of the verbal action. Such designation does not differ from the analysis of meaning of nonverbal action. An individual pushing another in the back may be interpreted as an act of hostility if the push inflicts pain or an act of concern if the push prevents pain, and note the contingency difference in slapping a cheek to prevent a mosquito bite or the same slap action to punish an insult. The analysis of verbal form applies principles applicable to all action that the world directly shapes to that subset of action shaped by a verbal community. For any action, controlling circumstances as elucidated by pertinent principles provides its meaning. The same principles work for actions governed either by someone's verbal utterance about a set of events or governed directly by those events. Science always seeks this kind of parsimony.

No distinction, then, resides between verbal-governed and event-governed behavior in the principles that control them. (A point made strongly by Skinner. Vargas [1988] explores the issue.) In verbal-governed behavior, the principles involved categorize the verbal relations. Does the principle involve deprivation or is antecedent stimulus control primary? Is one asking for a banana or describing a banana? Clearly there is no

such verbal relation as a mand or a tact without the controlling variables that denote them as such and detailed through the effects of the controlling considerations of reinforcement, punishment, discrimination, and induction. As Skinner makes clear as early as in a 1934 letter to Keller (Vargas, 1992), verbal forms are interpreted with these basic principles initially derived from his laboratory work and subsequent experimental analysis of behavior. Thus, applying behaviorological principles does not separate the analysis of verbal behavior from that of any other kind of behavior—for example, economic or political or social.

Within behaviorological science, the analysis of verbal behavior shares another characteristic with the analysis of nonverbal behavior. All verbal relations are operants. An operant is an action class controlled by a common consequence. Each action in an action class varies slightly or radically from all other actions in that action class. In short, actions within an action class may differ in form. The same operant may consist of different action forms. The operant *getting food*—a set of actions that result in alleviating ''hunger''—may consist of pecking a disk, ''pressing a lever,'' pushing a button, banging on a cage, opening a refrigerator. We can define the operant more narrowly in scope as for example pressing a lever, which may consist of a variety of downward motions with different parts of the animal's anatomy. The press of a right paw differs in form from that of a left paw. And as Allan (1993) has shown, the peck of a pigeon consists of a varied confluence of forms. Actions that differ considerably from each other may be in the same action class much as verbal forms that differ may be in the same category of verbal relations; and conversely action forms and verbal forms that resemble each other may be in different action and verbal classes. To which class they belong depends on controlling circumstances.

VERBAL BEHAVIOR

What, then, is the special nature of the analysis of verbal behavior? Why, then, did Skinner (1957) believe it required a ''special treatment'' (p. 2). Because it is *mediated* (p. 2); and this mediation is put in place by a verbal *community*. Robinson Crusoe on his island can get his berry eating shaped directly by sampling them. Or after he and Friday get acquainted and learn to talk to each other, Friday can tell him which berries are good when Crusoe wants to pick some. His contact with the berries is mediated by Friday whose verbal community fashioned his mediational behavior. In getting help from Friday, Crusoe learns the proper lingual forms of *berry*, *good*, *eat*. (The term *lingual* brings in more strongly the language community; more about that under the section ''A Further Step.'') We assume the proper socialization of Friday. Having been conditioned properly, he is a good guy and wants to help Crusoe and to teach him what to say when he wants something. It is this mediational behavior that demands a separate analysis, for such behavior is an intermediary for a world of events that does not control behavior directly. As Skinner (1957) puts it in his ''refinement of the definition of verbal behavior'' (p. 224): ''The special conditioning of the 'mediator' [substituted by me for 'listener'] is the crux of the problem. Verbal behavior is shaped and sustained by a verbal environment—by people who respond to behavior in certain ways because of the practices of the group of which they are members'' (p. 226). These practices consist of particular *forms* of behavior. What else would a ''practice'' be except that of a specific action distinguishable from others? The verbal community conditions the *mediator's* behavior to shape specific forms of action of the *verbalizer*.

In shaping the mediator's actions, the verbal community plays the central role in verbal behavior. The verbal community: (1) teaches the required verbal forms; as Skinner (1957) puts it, ''the form is eventually determined by the community—that is, it becomes conventional'' (p. 468); (2) shapes the mediating actions that consequent them; (3) specifies the conditions under which emitting those forms is appropriate. This third point is vitally important and goes to the heart of cultural context. Much, but certainly not all, of this point is analyzed by Skinner under his rubric of *audience control*.

In the shaping of only a specific and special shared set of forms that control behavior, the verbal community becomes a lingual community; no lingual community—no

language and thus no lingual behavior. To illustrate the above point a bit: If A (an English speaker) wants B (also member of English speaking community) to move, A may simply request it: ''Please move over''—a lingual action of the mand class; note that it would not work if B is a member of a Chinese (or Albanian, etc.) speaking community. OR: A can grab B by the scruff of his neck and move him. That action is not a lingual action for it could take place across lingual communities. It is also not a mand in a language other than the one taught, for its form is specific to a lingual community. In addition, the modality of the form taught is irrelevant, for lingual behavior can be emitted in oral, textual, gestural, or even pictorial language forms.

FORM

The above considerations set the stage to consider the significance of lingual form. What, then, is the importance of form, per se?

First, we rarely encounter the conditions responsible for what someone says, writes, or gestures. Put a bit more technically and narrowly—most of the time the mediator's behavior is not in contact with the variables responsible for verbal behavior. We handle the problem by assuming the propriety of the verbalizer's utterance. We take for granted that when someone says she wants an apple, that *apple* is exactly what she means. We do not go and fetch a kiwi or banana or orange. Such an assumption results from the pairing of utterances with objects and events. All utterance is paired in some fashion with the world about the person and in the person. Such pairing may be specifically taught (teacher holds up a pencil in Spanish class and says *lápiz*) or may occur through induction (the underlying force that drives metaphor and other similar verbal relations; note Skinner's discussion in the chapter on the tact but also elsewhere, such as the example of extended mands). Much, if not most, of our lingual behavior is not directly taught, i.e., not necessarily connected to the events to which nouns refer, for example, electron, genome, jealousy, and Hamlet's madness. It is also not necessary that a specific reinforcer follow every utterance anymore than what occurs in any schedule of actions, such as fixed interval. As with reinforcement controls in a contingency schedule, a mediating action need not be immediate for control of a specific action. A wife may write items in a grocery list and only later does the husband, reading the list, go to the store and then buy the items. The husband may even be puzzled by why his wife wants some of the items. He knows little or nothing of what disposed her to write her requests. He goes ahead and brings home the Canadian bacon anyway. Not knowing why (i.e., the conditions responsible) someone engaged in a given lingual action is typical, and probably the prevailing norm. Note that it is lingual forms that control the mediator's behavior, whether listener, reader, or whoever, not the conditions responsible for those forms.

Second, the problem of not encountering these controlling conditions is solved by the uniqueness of the utterance. These utterances have specific patterns—whether spoken or written or gestured or pictured (as in a hieroglyph). The particular configuration of their features is their form. To say *apple* is to express a sound unique from any other and thus to get an apple when one wants one. One may be hungry for an apple, be intensely deprived of one, but regardless of the controlling conditions and their strength, unless one states the proper form *apple* in an English-speaking community, then no apple will be forthcoming. Each lingual community has its own set of forms, of course, which makes up what is called its *language*. If you want an apple in a Spanish-speaking community, you would say *manzana*. Forms allow the mediator to reinforce the verbalizer's behavior without knowing the controlling conditions for the lingual utterance. These controlling conditions are assumed as embedded in the forms of the language. Someone may be in the kitchen and another person, out of sight, calls for an apple. An apple is dutifully brought; not a frying pan. (Two asides: First, note that such embedded meaning is why lying is so destructive to the validity of a language and to social trust; Second, note as well that the complexity of the autoclitic lies in the importance of embedded meaning in form as a primary controlling factor.) Specific utterance forms result in specific mediational actions.

Third, when action forms comprise the shared and shaped practices of the utterances of a community they make up language. Language carries the burden of meaning, that is, of signifying the conditions that impel people to speak, write, and gesture. Language occurs through conventionalized forms of action. *Implied meaning resides in action form*. Extraordinarily important: For as pointed out, we rarely observe the controlling conditions under which utterances are made. (The fear of cheating in web instruction is not misplaced.) Only sometimes can we observe the conditions under which a person says something. A person stands in front of a fireplace, rubs his hands, and says, *nice fire*, so we pair the statement with the fire and easily conclude that the fire and the person's emotional reaction to it ''caused'' the statement. If in an immediate situation we cannot observe the current pertinent factors presumably controlling what is said, then often we go by other correlative events typically paired with the cause. Someone says *my back hurts* and you see that person wince when he stoops, so the concomitant event is enough to verify that an out of sight pain is responsible for the statement. But directly observing the factors responsible for what is said, written, or gestured is atypical. A person says, *I gotta go*, and without further particulars you would not know whether the person must dash to the bathroom or to the office. (There are many side effects of this situation: For example, much propaganda relies on our not encountering the events that governments and other institutions market in certain fashions.) Most typically we must infer the cause of what was said or written. In language, form carries the load of implicit meaning.

A FURTHER STEP

In a footnote in his book *Verbal Behavior*, Skinner supplies the title of *Science and Human Behavior* as ''an extensive treatment of human behavior in general from the same point of view …'' and further asserts, ''The present account is self-contained'' (1957, p. 11). His throwaway statement is too disarming. It does not take into account *his* sophistication in his science to achieve an interpretation of language in such a unique way. Notwithstanding Skinner's implication that it is a maybe-action to take, reading *Science and Human Behavior* is a necessary prologue to understanding his analysis. The results of not doing so are easy to encounter. Mistakes are common—such as calling a tantrum a mand. We (and other animals) engage in all sorts of forms of behavior that indicate deprivation, frustration, prior stimulus control, and so on. When independent of the *lingual* forms of a language community, e.g., Mandarin Chinese, the multitude of action forms under the control of those dynamic variables is not lingual behavior. Beating your head against a desktop in frustration is not lingual behavior, drumming your heels in rage is not lingual behavior, pigeons pecking in experimental chambers for food is not lingual behavior, dogs sitting up to get fed is not lingual behavior, and no doubt the reader can supply many more examples exemplifying the control of phylogenetic factors and behaviorological principles. These actions result from accidental or deliberate contingency shaping independent of the lingual forms of a language community. We would be hard pressed to find a community that explicitly teaches parental behavior to reward tantrum behavior. In fact, the opposite is the case and is the reason why parents are often so embarrassed by their kids' meltdown in the supermarket. A lingual community trains behavior analysts to replace such actions with socially acceptable forms.

Some would argue that these conditional actions if mediated by another organism are *verbal*; maybe, if they fit other aspects of Skinner's descriptive definition of verbal. See Palmer (2008) for a discussion of the issues involved here. Palmer also mentions that Skinner's definition ''has a teleological flavor'' (p. 298). I would further add that Skinner's descriptions of the roles of *speaker* and *listener* gives them the *flavor* of causal agents. In more than one episode the ''speaker is reinforced'' and so is the listener. It personifies selection by consequences. Janet Browne's (2006) comments about Darwin's writing about natural selection are appropriate here:

> He often personified natural selection in *Origin of Species*. While this was perhaps unavoidable in the general sense, he frequently gave the impression that natural selection was an active agent.… The same entanglement occurred when

> he used the word ''adaptation,'' which hinted at some form of purposeful strategy in animals and plants, the exact opposite of what he meant. Later, he used ''contrivance'' as a partial solution. Over and over, Darwin struggled with his vocabulary. The language he had to hand was the language of Milton and Shakespeare, steeped in teleology and purpose, not the objective, value-free terminology sought by science. (p. 72)

Skinner (1988) was aware of the problem. He says, for example, ''The very expression 'what an organism does' is troublesome because it implies that the organism initiates its behavior'' (p. 469; see also his comments on p. 369). But Skinner, as Darwin, was a child of his culture and had at hand only its writing tools and the only antidote to the flavors mentioned above is to know his science, and even more, what it implies with respect to the presence of a homunculus.

In short, how could one understand Skinner's analysis of verbal behavior without familiarity with the principles and philosophy behind it? Misunderstanding shows in many people's reactions to his book. They either conflate it with some sort of antiquated associationism or stimulus-response behaviorism, never part of Skinnerian science, or they sneak in a disguised agency through the masquerade of surmised ''cognitive concepts'' or presumed ''new principles.''

The immediate prior paragraph is not an argument against pushing the envelope of Skinner's analysis, and extending its technical applications much as a number of behavior analysts in their engineering applications have done (e.g., Tu, 2006), or expanding its experimental analysis into the further examination of basic issues such as operant-respondent relations (e.g., Allan, 1998), or asserting conceptually that a better term for so-called ''private events'' is *single-observer observations* (my position). It is an argument for such a push within the framework of behaviorological science; and speaking metaphorically, adding plumage to the current Skinnerian bird feather by feather. Skinner used the term *verbal behavior* to underline that his analysis was not within the linguistic tradition of attending to the listener's behavior. He placed particular stress on addressing the controls over the speaker. Of course, controls over the behavior, wherever sited, defines the role. When controls of verbal behavior shift to the listener, that person then becomes the speaker. Skinner did not, however, neglect the role of the listener, better termed *mediator*. (And neither have others working within Skinner's framework of analysis, e.g., Greer & Speckman, 2009.) Further, in the shaping of the mediator's behavior, as well as the verbalizer's, Skinner also frequently mentions the importance of the community, an unescapable importance, since the community shapes the mediator to consequent utterances and their forms. Sundberg (2011) notes over several hundred references to *verbal community* in Skinner's writings. But as Skinner stated explicitly, he did not engage in a ''functional analysis of the verbal community'' (1957, p. 461) much less a thoroughgoing and detailed one. Such an analysis is at a different level of conceptualization, a level that linguistics addresses; a point that Skinner also made. More will be said on this matter. A science accrues its plumage slowly.

Verbal and Lingual Behavior

Along the lines of an additional feather or two, in discussing ''form'' above, when relevant I substituted the term *lingual behavior* for *verbal behavior*. My reason? The substitution emphasizes the role of the lingual community. Such an emphasis is long overdue, and will facilitate a rapprochement with linguistics. A linguistic analysis complements a behaviorological one. (Matos and Passos [2006] make this point strongly; and Passos [2007] emphasizes it further.) The two fields have much to offer each other in the study of language—the conventionalized *forms* of actions of lingual communities.

The differences between verbal and lingual behavior were adumbrated but not filled out—of necessity. This article earlier addressed the importance of form to Skinner's analysis of verbal behavior. It did not examine the relation between verbal and lingual behaviors in detail as that addresses a different topic altogether. Now that the reader has encountered the two terms and the subtle hints of their roles with respect to each other, a more explicit statement (and only a brief one) can be made why we need to stretch Skinner's approach to language a bit further. And it is only a stretching—at present.

If for biologists the problem of *species* represented that ''mystery of mysteries'' as Darwin (following Herschel) put it, then for behavioral scientists and for many philosophers beforehand, the problem of *language* has presented a more or less equal conundrum. The three great puzzlers have been: What is meant by *meaning*, that is, what is signified by any given language form? What is the *origin* of language, that is, is it inherent to the particular biology of a given species or does it arise from its given members' interactions with each other? What is said to be *language*, that is, what designates a particular sound or mark or gesture as language, and how do these operatively interact? Though Skinner disavows that his analysis is of language, and curiously enough his assertion is both accurate and inaccurate, his extraordinary and unique analysis of verbal behavior allows a resolution of the prior problems, especially meaning and origin. *Language*, in its ontological sense, requires an additional level of analysis.

Meaning. *Meaning* has been the bête noire of every language and linguistics theory. Meaning has been ''chopped and diced,'' ''expanded and contracted'' under a variety of terms: *semantics*, *pragmatics*, *syntactics*, *referents*, *connotations*, *denotations*, *signs*, *signifiers*, and so forth. In the field of linguistics, a demand still exists that *meaning* be clarified. Despite an effort to make meaning peripheral to the analysis of syntactic structure, the field of linguistics has moved strongly to clarify the relation of language to the reasons for it, which of course brings meaning immediately to the foreground. The current effort ends up with the familiar meaning of meaning in what the speaker plans, intends, conveys, and so on. Especially in cognitive linguistics, the tendency has been to relate meaning to a ''theory of mind'' and to substantiate that theory by speculations on how the brain operates with respect to language. Such speculation pushes causation back into the mind and the brain. (Suzanne Kemmer [2010] provides a concise and excellent review of cognitive linguistics. My summary, which also draws from other sources, is not necessarily hers.)

With his definition of meaning as the controlling contingencies (the independent variables) responsible for an utterance of any form and in any mode—spoken, written, gestured—Skinner cleared the clutter of cognition from verbal behavior, as well as from language. It was no longer necessary, for example, to derive meaning from the intent of the speaker, an intention linked to a theory of mind that presumably provided the reasons for what was said, or written, or gestured. No longer was it necessary to have a mental construction associated with a particular verbal form. The latter effort requires knowing what gave rise to that mental construction independent of the verbal form from which it is deduced; a requirement that has helped pushed inquiries into concomitant brain states.

Skinner directly derived the processes of his theoretical formulation of verbal behavior from his experimental analysis of behavior. Behavioral processes were immediately observed and described. The starting point was postcedent selection processes on a prior class of actions; like Darwin's *natural selection*, a monumental step in the analysis of causal origins. Galileo and Newton clarified the antecedent material origins of physical phenomena—no more Neptunes sloshing the waves or objects falling to earth due to their impetuosity. (See Butterfield's, 1953, rather winsome discussion on the latter, especially chapter 1.) Due to the diversity of forms and functions in biological phenomena, no equivalent antecedent mechanism had been found and the default position had been to invent a spiritual cause. The postcedent process of natural selection eliminated that nonmaterial origin. Skinner's selection by consequences does the same thing for the individual organism. No more mini-god within the organism who exercises its free will (outside the dominion of nature as Spinoza would put it), much less its intentions and purposes. Even more to the point: A hypothesized set of processes intermediate between antecedent variables and subsequent dependent variables are not necessary to adjust the discrepancy in their pairing of values. A direct functional relation occurs between the pairing, for example, of a reinforcement process to the increase in probability of a prior class of actions. These postcedent processes underpin his analysis of mand relations. But two-term contingency relations is not all there is to the analysis of behavioral phenomena. Actions take place in context, in antecedent physical and organic

settings (both body and environment) with events occurring over time. When elements of that setting get paired with two-term contingency relations, under specific circumstances they increase (or decrease) the probability of operants occurring. The analysis becomes a three-term contingency one, or a contingency set with as many terms that can be added in an unequivocal fashion. This group of processes underlie his analysis of tact relations. Combining the two processes (along with their attendant mechanisms, such as induction, as laid out by Skinner and others) allows the analysis of many other relations, such as the behavior-behavior one where verbal stimuli (prior action forms) control subsequent verbal behavior, or such as multiple control relations where combinations of ''fractional'' antecedent and postcedent stimuli combine to produce new (often merged fragmentary) verbal forms, or such as autoclitic relations where well-in-place verbal relations (an initial verbal system) have their meaning altered by the effect of a new stimulus that changes the impact of a prior verbal form upon the mediator's actions. The analysis achieves its effects with as few basic terms and processes as possible. It wields Ockham's razor with a highly sharpened edge. It does not need ontological add-ons, either from philosophy or physiology. None of these dynamic relations specify an active brain part or a willful agent. With the individual as with a species, teleological states such as ''purpose'' result from prior selection effects. The same kind of controls as those over all behavior denotes meaning. *Meaning* is the interplay of those controls over a specified type of special behavior—one mediated by a community.

Origin. Fish swim. Birds fly. Humans talk. The first two kinds of animals do so with a type of anatomy and physiology suited to their environment. A fish's fins particularly suit it for moving in water and its gills for extracting oxygen from it. A fish out of water is a sad specimen of flopping futility. The bird's tensile strong but ''skinny'' bone structure allows a lightness of being that facilitates flight. Concurrently its digestive and respiratory systems also evolved for an environment of layered gases with particular pressures. Our third animal, the human, possesses a vast physiological and anatomical apparatus particularly suited for speaking, marking, and gesturing. Brain parts and facial structures and hand constructions all facilitate verbal behavior and do so within a particular social environment. All human children emerge into a sea of chatter. Can language emerge independently of culture? The degree to which becoming a lingual human requires a culture has been addressed in a case study manner in the ''wild boy'' literature. Harlan Lane's book, *The Wild Boy of Averyon* (1976), is the classic here and provides a good review of the issues and literature to that date. A more recent book (Newton, 2002) takes a more literary approach. A problem persistently raised is whether the ''wild children'' were physiologically damaged and so never could reach a lingual proficiency. In disputing whether heredity or heritage is the primary factor in language proficiency and in asserting that one is the tabula rasa for the other, the point is reached where only circular assertions can be made. Behavior results from the interaction between anatomy and milieu. Despite its wings, could a bird fly without an atmosphere?

Due to phylogenetic origins, humans do not swim like fish nor fly like birds, and neither fish or bird talk like humans. No doubt language requires a particular genetic endowment. The degree to which it is solely responsible, especially for grammatical relations, is a matter of some disagreement. Though it is asserted that there is an innate apparatus for grammatical construction, others dispute the assertion. As Deutscher (2005) puts it,

> Many people outside the field of linguistics are under the impression that there is an established consensus among linguists over the question of innateness. The reality, however, could not be more different. Let five linguists loose in a room and ask them to discuss innateness—chances are you will hear at least seven contradictory opinions, argued passionately and acrimoniously. (p. 16)

> The human brain is unique in having the necessary hardware for mastering a human language—that much is uncontroversial. But the truism that we are innately equipped with what it takes to learn language doesn't say very much beyond that. (p. 17)

Almost all agree that to speak (especially properly) English, Chinese, or Spanish, one needs a community that takes untutored gestures and sounds and marks and shapes

them into the correct language forms (*apple* instead of *manzana*) as well as the correct connections between those forms (*these are* instead of *these is*). As Shaw so cleverly plays with this theme in *Pygmalion*, variation in language forms even within the same language community reveals socialization from a particular social class. It is hard to line up a Professor Higgins for one's own little Eliza; nevertheless everyone demands good teachers for their kids. Whether professionals or parents teach, forms of language control take many years to shape. A community raises a new born and from an array of its movements and sounds through mediated action fashions a portion of them into a repertoire that controls the actions of others in the community. The conclusion that a social environment of prior behavior shapes new behavior in a form acceptable to a particular community becomes unavoidable. How else?

Yes, but! Even when data in observation studies point to this conclusion those data may be resisted and interpretations made that selection processes in a culture are not that important. But in a fine article, Schoneberger (2010) peels off the myths over the exegesis of studies examining parental ''feedback'' to their children's utterances. The myths propound that parental consequences do not shape their children's utterances either through positive or negative feedback. The studies have been misinterpreted. As Schoneberger states (in a rather cautious way) ''This research suggests that reinforcement can be effective in strengthening grammaticality in children during language acquisition'' (p. 114) and further (p. 125), that corrective feedback (and negative evidence) will also result in correct utterances.[2]

In defining *verbal behavior* as behavior mediated by other behavior, Skinner points to an everyday observed event by parents, teachers, and others. And in his later more exact, ''refined'' definition, he states that such mediated behavior is specially conditioned in the mediator's repertoire by a verbal environment—the practices of a community. Thus, he positions the community's culture as the primary *origin* of verbal behavior; certainly of its lingual forms.

Language. A problem arises. Apparently any behavior mediated deliberately through the aegis of a particular community counts as verbal behavior. As Skinner (1957) puts it:

> Any movement capable of affecting another another organism *may* be verbal.… Audible behavior which is not vocal (for example, clapping the hands for a servant or blowing a trumpet) and gestures are verbal, although they may not compose *an organized language*.… Pointing to words is verbal—as, indeed, is all pointing, since it is effective only when it alters the behavior of someone.[3] The

[2] It is a must-read article. Schoneberger (2010) covers a lot more ground than here allotted to his survey, for example examining Gold's Theorem, and he presents a harvest of articles on verbal behavior from which he reaps his conclusions. The powerful conclusions he wishes to drive home are that the original articles cited never claimed to offer data that adults do not reinforce children's utterances, never claimed that adults do not provide negative evidence, and further, that Gold's mathematical theorem never claimed the proof asserted to it.

[3] But as Skinner (1957) then points out, it is verbal only if a verbal community precisely conditions a mediation action to shape that particular action. Genetic communities shape through natural selection many pointing responses that alter the behavior of other organisms within that species. Note that his later more precise definition (pp. 224–226) restricts the too broad coverage of the earlier working one.

Passos (2012) makes the point that by how Skinner (1957, p. 108) wrote his footnote allowing for mediational shaping of infrahuman action, he restricts tightly the too broad inclusion of infrahuman behavior within the category of verbal behavior. She further points out that he explicitly stated ''in *The Behavior of Organisms* (1938/1991) that pressing the level by the rat is not like verbal behavior …'' (p. 121). Passos does a fine job clarifying this fuzzy issue of inclusion by blending in-depth scholarship into linguistics and into Skinner's science with an incisive analysis of his writing style. Passos (2012) and I came to the same conclusion: that more must be covered beyond Skinner's definition and analysis of verbal behavior if such an analysis is to encompass what is distinct to the language activity of homo sapiens. This ''more'' is the inclusion of the community's conventional consequencing of stipulated action properties, defined by and large by their form or topography. Passos would redefine Skinner's denotation of verbal behavior to include the community's actions and its effects. I would maintain his definition of verbal behavior as is, but to analyze language would now add the category of lingual behavior so that prescribed form becomes necessarily partnered along with social mediation, and as such includes what the community's actions shape and differentiate from other action topographies. As stated earlier, language requires its own separate analysis.

> definition also covers … the use of ceremonial trappings. (p. 14, italics added)

Skinner subsequently notes in an almost throwaway footnote:

> Our definition of verbal behavior, incidentally, includes the behavior of experimental animals where reinforcements are supplied by an experimenter or by an apparatus designed to establish contingencies which resemble those maintained by the normal listener. The animal and the experimenter comprise a small but genuine verbal community. (p. 108 n. 11)

He is logically consistent.

But the definition of verbal behavior violates our sense of language. As we were specifically taught by our community we teach the family dog or cat to bark or meow at us when it wants food, and that particular sound (or gesture, as either could sit for its food) mediated by us for its consequence now becomes—even under the restricted definition—a mand. But no matter how well shaped to mand within the range and forms of its sounds and gestures, the family cat does not designate which of its meows are nouns, which verbs, which adjectives, which direct objects, nor parse its meows to indicate their syntactical links. Nor does any community of cats share sounds and gestures that control beyond those of phylogenetic origin—the yowls of a cat fight do not translate into a speech at the United Nations stating ''My nuclear weapon is just as nasty as yours.'' The cat taught to sit under control of *sentarse* and through its mediated gesture obtain a consequence from a nice Mexican couple, would be hard pressed to emit the sound form of *sentarse* or to teach its gestural expression to another cat so that cat could mand, by sitting, the same couple's action. The Mexican couple could verbally mediate their cat's action but not shape lingual activity that could be used by their cat to shape further lingual forms in other cats. If cats could take the further step to possess and present the lingual forms of Spanish in their repertoire, then they would be a part of that lingual community. That does not happen. Throughout the cat kingdom from the small kitty to the big feline, there are no lingual forms, in whatever modality, which cats share with any lingual community of humans. The sharp snap of a trainer's whip may mediate a lion's sitting on a stool but the conditional stimulus is not English. Circus animals do not sit around with their trainers to discuss what might be the best show pleasing acts and their sequence. Skinner *did* say he was not analyzing language, so we must take him at his word. So what's the result of his analysis? Beyond the already significant practical results extended to so many in wide-ranging educational and clinical and organizational settings, a mighty one. (For numerous examples from the classroom see J. S. Vargas [2013]; and for its general impact see Petursdottir, Peterson, and Peters [2009]; as well as Schlinger [2008].)

Through his analysis of verbal behavior, Skinner positions us to analyze any institutional activity, not simply that of language. All institutional activities, for example economic, political, medical, or military, can be characterized by the fact that communities mediate the proper forms of endeavor within those institutions. At the core of the origins of membership within any of them is verbal behavior. Mediating activities are taught to shape precisely the verbal actions required so that other members of the same community can be controlled, and controlled with respect to the singular events that concern that community. The underlying mechanisms for such shaping of mediational activity are the processes derived from Skinner's experimental analysis of behavior. No agencies with particular traits need to be hypothesized. This is an extraordinary contribution. It just waits to be applied to these other institutional domains. The analysis of verbal behavior would clarify the problems in the explanation of institutional behavior. For example, economists, such as Hodgson and Knudsen (2010), attempt to apply Darwinian concepts to the analysis of economic behavior. It is a worthwhile endeavor. In the economists' efforts to apply Darwin's Theory of Natural Selection a number of interesting insights have been gained, such as what benefits the individual does not necessarily benefit the group (Frank, 2011), an implication with reverberations to the operations of the so-called free market. A difficulty quickly occurs. In talking about the impact of selection mechanisms upon the group, economists

default to agency traits such as *purpose* and *intention* in explaining the behavior of individuals within the group, but such terms explain nothing. The Darwinian and Skinnerian frameworks perfectly complement each other. (A behaviorological position shared by nonbehaviorologists; see for example, Fuller [1978], especially his comments on p. 100.) The circularity of current economic analysis could be avoided by utilizing Skinner's mechanism of contingency selection.

But a move to provide the behaviorological framework of explanation for behavioral phenomena within a domain of cultural activity must be tempered with the realization that each domain has its set of abstractions that must be dealt with in their own terms. For example, in dealing with the institutional area of economics, the concept of *value* must be sorted out, the roles of micro- and macroeconomics comprehended, and the different definitions of money understood. These are abstractions relevant to the exchange nexus that describes economic activity. Also, the behaviorological interpretation enjoins a macrocontingency analysis (Ulman, 2006). Monetary and fiscal policies require a level of examination pertinent to aggregate behavior. Knowing the individual contingencies that explain why a particular person goes to the bank to obtain a loan does not explain the widespread societal effect of a drop in the interest rate. The distinctive contingencies relevant to one person may not be pertinent for a few millions of others. But the fact that such general hustle and bustle is conditional upon societal shaping provides us with a start in clarifying the happenings of various cultural institutions, if for explanatory reasons we drop down to the level of individual action as economists tend to do. Such a drop brings in Skinner's framework of verbal behavior. Verbal behavior bridges behaviorological principles onto other modes of inquiry and explains through interpretation institutional activity designated by its thematic content.

Like the highly mediated exchange activity known as *economics*, language is not verbal behavior but stems from it. Verbal behavior provides the foundational provisions for language. To underscore and summarize the earlier elucidation: Skinner's analysis of verbal behavior provides two dynamic attributes to the understanding of language. The *meaning* of language is the controls under which any lingual form of action occurs—a position at which linguists also end; there is cause behind what is communicated. The *origins* of language are mediating actions between forms of action, the conditions that evoke those action forms, and the consequences that ensue from pairing action form and mediated effort. These mediating actions are specifically shaped by a community to reinforce (or punish) verbalizations (as action forms under the proper controls) to fit the uttering practices (as lingual forms) of the community. (The *origins* attribute has been the most contentious: As with fishing and swimming, a biological, and ultimately physical, substrate carries out the talking. It does not follow that talking originates from within the substrate. What is the origin of Siri's talk within the iPhone?) The analysis of verbal behavior addresses the actions of the individual. But community practices precede the verbal and lingual actions of any individual. A further analytic step takes us into the community practices that constitute language. Community practices possess properties independent of the singular relation between controlling events and individual action. The analysis of these practices and properties is the analysis of aggregate action. It is these aggregate practices and their emergent properties that becomes *language*.

Lingual Behavior

The emergent qualities of language are the specific abstractions that describe it, and its changes over time demand an analysis in their own right. Linguists by and large follow such a path. From a formal feature in their lingual behavior, Everett (2008) describes a living condition for the Pirahãs, and infers the reasons for a missing vocabulary. In describing the Pirahã language, he points out:

> Some evidence already exists that the Pirahãs are not originally from the part of the jungle where they currently reside, from the lack of native vocabulary for some species of monkeys found around the Maici. The Brazilian monkey *paguacu* (a name from the Tupi-Guarani

> linguistic family) is referred to by the Pirahãs by the same name, for example. That makes paguacu a loan word, borrowed from Portuguese … found in their homeland, wherever that might have been. (p. 29)

Such description is not that of the dynamic controls over a particular individual speaker's actions.

Though we may understand a particular individual's utterance of language (the lingual forms of a community), the properties of language do not reduce to the contingent controls over a particular individual's utterance. Above, Everett (2008) reports on a characteristic of the aggregate practice of lingual behavior. Even more to the point, through Everett's inductive analysis of the Pirahãs language and his years of direct contact with it, he noted that there were no recursive elements to it, no counting component, and no observable features providing evidence of an underlying universal grammatical structure—although he had started his understanding of language from that perspective. Through these aggregate features (or their absence) he examines an issue in lingual origins that could not be addressed simply by looking at one individual's speech. Burchfield (2006), a charming and crotchety writer, describes the many changes in the English language over the many centuries of its expression. Without dealing with the conditions controlling a particular individual's speech, he examines the conditions that control the characteristics of a language: the imprecision of sounds, the migrations of groups, the social and political developments within and between societies. How these, for example, ''as the centuries pass,'' can change ''Old English, an inflected language,'' to post-Conquest English where ''ordering of words can and normally does reverse the meaning'' (p. 170). (Note the phrase, ''reverse the meaning.'') Bower (2011) summarizes the work currently examining the evolutionary changes of related lingual forms in languages grouped in family trees, ''called phylogenies'' (p. 23). Statistical analysis finds that topographic features, such as word order, vary systematically across major family types. These language features of a community's lingual actions do not describe the immediate situational effect on an individual's verbal action.

Language features constitute the abstractions of language found when you examine community practices in the aggregate, and summarize them in terms independent of individual action. Community practices shape mediated behavior that prescribes its consequences as well as the forms upon which those consequences are attendant, and the result constitutes lingual behavior.[4]

Lingual Behavior, Language, and Other Species

A last issue remains: The distinction between verbal and lingual behavior requires the matter of language in another species to be addressed quite briefly. We can come to one conclusion quickly: Though other species may have verbal behavior, they do not engage in our kind of lingual behavior—Chinese, English, Spanish, and so on—and socialize their young in it. Lingual behavior occurs only with the aggregate forms of a particular language. These forms articulate the specialized abstractions of that particular language—Chinese, Japanese, Spanish, English and so on—throughout the more or less 7,000 extant languages (Ostler, 2010). In any particular language, these lingual forms constitute a community's controlling elements. The difficulty, however, for both linguistic and behaviorological analysis in sorting out the effects of functional controls is that meaning is both part of and independent of form. And form provides only a probability index of the controls implied outside of that form, as shown clearly in problems of translation. ''Translators are traitors'' because the meaning (when it

[4] Meaning will still be what controls the utterances. If control ensues from the forms of language, its topography, meaning resides there. Skinner did not abandon his concept of meaning in the analysis of intraverbal behavior, i.e., verbal behavior under the control of prior forms of verbal behavior that evoke other forms. (Intraverbal is a better category name for the entirety of this subset of verbal relations; Vargas, 1986.) In the autoclitic a stimulus feature outside the form features of the primary verbal system changes the effects of the primary forms but control resides in part, perhaps mostly, in those forms. As an instance, note the example given on p. 315 of *Verbal Behavior* (Skinner, 1957) and particularly the discussion on relational autoclitic behavior including that on ''frames'' (p. 336).

specifies the exact controls over an individual's actions) inherent in the forms of one language cannot be exactly translated into another. Even within the same lingual community, variation occurs in the effects of controls by and over lingual forms. To the degree that cultures share the same properties of control, equivalent meanings will obtain between different forms of the same controlling variables. Due to the difficulties of ''translating'' controls, the equivalence of meaning with ''community communicative'' practices and thus action forms of another species would be even more formidable than with ours. Such a conclusion should not imply that it is impossible. Anyway, that is not the issue. Rather, the question is whether other species have language with their particular forms of lingual action.

So we shall frame the question differently. Do other species verbalize with their own particular language and lingual behavior? Though the literature is large covering species from bees to dolphins, ants to gorillas, only the shortest of statements is possible here. Some regard humans as the only species with language, presumably due to an inherent characteristic found only in humans, such as a universal grammar instinct. That may be. We may even possess a universal incest taboo as well, since in every culture incest rules are found that specify parameters of sexual relations between family members. But for behavioral scientists, in company with biologists, inherent characteristics of an organism are not even a proper inquiry. In agreement with Mayr (1991), our concern is not the essential nature of organisms.

We do not study rats, pigeons, or people when we analyze behavioral phenomena anymore than biologists study sweet peas, corn kernels, and fruit flies when they analyze genetic phenomena. They study life, self-sustaining processes and the conditions under which these occur. We study behavior, specifically classes of actions and their properties and the conditions of their occurrence. Variation occurs with actions and their properties as it does with biological phenomena. Variation in the properties that characterize species makes it difficult to define with exactness the beginning and end points of properties and even where one species ends and another begins. The term ''species'' is a core concept in biology. Due in part, however, to the problems raised by variation of its members' characteristics, there is no agreement among biologists on how to define species (Ptacek & Hankison, 2009, particularly pp. 179–182). Our task is simpler than that of the biologists. We are not trying to define what *Homo sapiens is* or whether an inherited essence restricts lingual behavior to it. Our task is to be as clear as possible with the behavioral phenomena with which we deal in *Homo sapiens* and other species and to be as accurate as possible on the functional relations between actions and the events upon which they are contingent. Does the behavioral phenomena we call *lingual behavior* vary? Yes. Does it vary between species? It looks that way.

CONCLUDING REMARKS

The study of language has been the province of linguists. Linguists denote their analysis of language as scientific. It is. Their analysis, however requires principles that explain the behavior exhibited by language forms. In linguistics these principles have been by and large ad hoc, ranging from inferred genetic mechanisms to brain mechanisms, both with an assemblage of cognitive constructs. Each theorist tinkers these constructs into a variety of theoretical edifices undergirded by a core agency that acts upon the world. The underlying assumption of mind or of agency remains constant. In contrast, a behaviorological analysis eschews any hint of a homunculus. Any action that occurs does so from the contingent effects of a current situation upon the genetical and experiential history of an organism. It is the relations between properties of behavior and the independent variables responsible for them that are the focus of inquiry, not the substrate of the body (or presumed being) in which they may happen to occur. If this notion seems strange, note that at the beginning of modern experimental physics, Galileo was examining the movements of balls down inclined planes not the balls themselves or how movements were stored in balls or what impetus motivated the balls to move. Given such diverse assumptions

between those analyses, can behaviorological and linguistic theory connect?

In 1982, Pere Juliá raised the issue of whether linguistics could ''contribute to the study of verbal behavior'' (p. 9). He was rather pessimistic. The primary difficulty he saw in a ''rapprochement'' was that it would not lead to a greater understanding of language but instead to a subversion of the principles that Skinner advocated in the analysis of verbal behavior. It would lead to a ''subservience'' to the explanatory framework of linguistics. He illustrated the creeping agencyism that could occur with a number of quotes culled from a variety of behavior analytic sources, both from writers and journals. He cited the following sentences, among others, published in the *Journal of the Experimental Analysis of Behavior*: ''It may be more accurate to say that some internal trace or representation may serve as a cue,'' and ''S(ubjects) learned a representation of the sentence'' (Julia, 1982, p. 9). In such an accommodation, to quote Juliá (p. 10), it is the ''underlying assumptions about the subject matter'' that matter. Thirty years later, the points that Juliá raised in his excellent examination of the problem still pertain.

Yet, it is linguists, such as Susanna L. Ornat and Pilar Gallo (2004), who offer, at least in part, a rapprochement from one particular linguistic viewpoint, *constructivism*. As they put it, quite succinctly, ''the constructivist models describe language acquisition as a process of ontogenetic, gradual, complex, and adaptive change'' (p. 161). They analyze the development of language as a gradual and complex change in the individual (see p. 163). Skinner's Theory of Behavior fits in nicely as it provides the mechanisms—primarily reinforcement—by which such adaptive change occurs, as a society about the child reinforces the lingual forms that child imitates and utters. Naturally, the paradigms are not entirely compatible. As Ornat and Gallo put it, ''Current constructivist models propose a system that starts applying general cognitive processing mechanisms to the linguistic input until it is able to extract some partial regularity'' (p. 165). It is circular, of course, to conjecture such a ''cognitive processing mechanism'' from the increasing grammatical regularity of language usage, and thus the intense hunt for the neurological snark. But the hunt is at least in one right direction, for any such discovery would further squeeze out the necessity for an independent theory of mind; better yet, would be to further correct the direction.

Instead of a quest for a theory of mind or of neurology, linguists move on the right track when they begin to seek an explanatory framework for the forms of language and their use in a theory of behavior. The analysis of verbal behavior supplies a stepping stone into the analysis of those community practices exemplified by their action forms. Form is a consistent attribute of any action of any animal, including the human one. An action cannot be named without designating its form or movement pattern. Sometimes the pattern is complex, sometimes it is simple, but always there. Once given its name and thus its boundaries, vague or sharp, it is possible to state how this action interacts and interrelates with its immediate milieu. Events predispose, in a probability fashion, that such an action (more accurately, its category class) increases or decreases in frequency by what happens either after or before it. Skinner's behavioral theory starts with what happens afterward; and the detailed analysis of those postcedent events with respect to action classes becomes quite complex as their schedule, intensity, immediacy, as well as prior events, are taken into account. Skinner's theory applies to any action of any animal up and down the phyla of the animal kingdom. No action is exempt. Speaking loosely, what animal does not seek nutrition and repeat any action that obtains it, or what animal, when it takes action to escape danger and if danger once again threatens does not tend to repeat its action again? And of course animal actions, of whatever form, not only contact their milieu directly but through the activities of other animals. Ants obtain nutrition by farming aphids. The proper gesture directs the hunting dog to retrieve the pheasant and the bugle sound sets the hounds and horses to chase the fox. The waggle figure-eight dance form of the honeybee indicates direction and distance to a source of nectar and pollen. The correct form, *May I have …*, gets turkey served at the festive dinner. Form allows us

to talk of what actions are at issue and Skinner's theory to explain them. Lingual behavior specifies the subset of action forms evolved over time from the practices of community members as they deal with each other and their immediate world.

Of course, the prior all rests on the foundations laid out by Skinner in his analysis of verbal behavior. *Verbal Behavior* is a great book. What it provides is a leg up for our continual efforts to explain and understand language—whether of animal communication or human culture. Skinner would not have claimed more.

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